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**Developmentally Appropriate Evidence-Based Practices for an
Older Adult Balance & Exercise Class**

Senior Honors Program Paper

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Introduction and Background

Developmentally appropriate practices are usually mentioned in the context of young people. For children, development represents growth and maturation, speeding forward to later life. Bodies change, brains develop, and tasks and the environment are molded to best fit each individual person. It is thoroughly recognized in modern society that each child should have the opportunity to grow, learn and become anything they want to be, in a nurturing and suitable atmosphere. Why then, does this principle not apply to all people across the lifespan? All people are singular individuals who require different circumstances to be their best, but adults largely are relegated to a one-size-fits-all mentality. Because of the freedom of choice many middle-aged adults enjoy, some of these tendencies to lump people together are neutralized. However, one group that is consistently underrepresented and highly generalized is older adults, those over 65. In children there is an acknowledged spectrum of ability for physical, cognitive and social qualities, but older adults are many times still expected to perform as they had previously in their adult life. There has not been much attention to how older adults change over time and how activities they participate in can be tailored to their specific needs.

To describe the limitations and restrictions that are placed on older adults, the theoretical model as proposed by Newell becomes relevant (Newell, 1986; Newell & Jordan, 2007). In what is known as Newell's Task Constraint Model, there are three types of "constraints" or limiters that interact and form the basis for a person to perform a given activity. Shaped like an interconnected triangle, at the top are Individual Constraints, which are further broken down into Structural and Functional Constraints. Structural Constraints are physiological aspects of a body, such as limb length, muscle strength and speed of neural connections. Functional Constraints are feelings and motivators for an activity, such as fear of falling, confidence in balance ability or a desire to

participate in a social exercise environment. It is important to note that Individual Constraints cannot truly be changed, rather the other two types of constraints, Task and Environmental, must be altered in order to facilitate the activity in spite of or in conjunction with Individual Constraints. Task Constraints are those that have to do with the goals of a particular activity, the rules that surround the activity and the equipment choices. Environmental constraints relate to the surroundings during the activity, such as the temperature, ambient noise, qualities of the floor, and other people in the vicinity. Considered together, these are what describe the setting and circumstances for any given activity (Newell, 1986; Newell & Jordan, 2007). The interaction and acknowledgement of the specific constraints experienced by older adults can influence how developmentally appropriate practices are created.

Of particular note is the attitude that is given toward physical activity and older adults. There are recommendations for how much, how long and what kind of activity people over 65 should be taking part in, but very little about how to make these pursuits appropriate. The current population of older adults faces a number of barriers to their physical activity, ones that people of younger generations may not be aware of or pay attention to. When these seniors were young, exercise or physical activity was not emphasized in its own right. It was commonly either playing as a child or done in an occupational sense, where people worked hard at their jobs and did not think to do more in their leisure time (King, 2001). Reasonably, a good number of adults get to their old age and have never exercised just to exercise before. This is troubling when considering that the greatest source of self-efficacy for older exercisers is childhood experience; these people have a harder time starting a physical activity regimen in the first place. Additionally, older adults may have already passed through a number of developmental milestones in their lives that could make physical activity seem more daunting and frightening. Passage through menopause, a recent

history of falls or fractures, the loss of a partner or spouse and a move from an independent living situation all influence physical activity rates in seniors, and when they are not appropriately addressed, could make people feel excluded or scared. Lastly, virtually every time an older adult is given advice or supervised during physical activity, it is by a younger person who may have a vastly different way of conceptualizing exercise and how to motivate others. The intergenerational gap could prevent the younger practitioner from understanding the needs of the older adult, and the older adult from being as positively impacted by the provided benefits of exercise (King, 2001).

In combination with all of these developmentally challenging situations surrounding older adult exercise are a number of more regularly talked about barriers to physical activity. These are such as perceived poor health, an inconvenient environment where perhaps the facility with exercise equipment is a large distance from older adult residences, lack of physician intervention or advice, as mentioned before lack of knowledge that exercise is an option and is necessary for older adults, and little experience participating in physical activity for its own sake (Schutzer & Graves, 2004). With these barriers and the previous issues specific to the development to older adults, physical activity can seem incredibly daunting. This is illustrated by the recent statistics from the President's Council on Fitness, Sports, & Nutrition in 2015, which stated that the current rate of exercising at the recommended total 150 minutes over most days of the week is being completed by approximately 35% of the population over 65 years.

When older adults do exercise, if they are not doing it at home, likely they are making the trip to a supervised facility, such as a senior center, hospital, clinic or recreation center (Belza & the PRC-HAN Physical Activity Conference Planning Workgroup, 2007). For measures that are particularly applicable to older adults, it has been shown that supervised exercise opportunities and

groups effect more change on measures of fall risk, functional mobility and flexibility than at-home prescribed exercise programs (Donat & Özcan, 2007). Confidence in difficult balance activities was also increased more in group settings as opposed to individual home programs, and the changes were represented better at the six month follow-up (Judge, 2003). Encouraging the group exercise component, in addition to the respect of the developmental challenges and other barriers faced by older adults could be the best way to increase their rate of physical activity participation.

Methods

Bearing all of this information in mind, the purpose of the project described here was to collect information to design developmentally appropriate, evidence-based exercise practices for older adults in a balance and exercise class. Internal Review Board approval was received, and a senior exercise class was approached about participation in the study. The specific class in question was held three days per week at the Eppson Senior Center in Laramie, Wyoming. It was led by three different interns or employees at the Eppson Center who are Kinesiology and Health Promotion students from the University of Wyoming. All those who participated signed consent forms to be passively observed on four consecutive class days during the exercise class time. No identifying information was collected on the participants. The participants ranged from the highly able to the moderately impaired, and all came to the class with the intent of improving strength, cardiovascular and balance abilities. Being a member at the Eppson Center was necessary for participation in the balance and exercise class, and all the participants were community-dwelling. The goal of the observation of the class activities was to identify possible individual, task and environmental constraints influencing the performance of the participants. These observations were then compared to the current research literature on older adult physical activity, constraints,

motivators and best practices to produce a list of suggested developmentally appropriate, evidence-based strategies to be implemented in the senior balance and exercise class at the Eppson Center. In the next section will be a comprehensive list of the observations made of the senior exercise and balance class, including identification of the individual constraints affecting the participants, followed by the evidence-based recommendation and how the task and environmental constraints can be changed to facilitate the recommendation.

Observations and Recommendations

Observation 1

In general, the participants in the class displayed decreased muscle size and tone in their lower extremities.

Constraints: Older adults frequently have a predisposition to sarcopenia (muscle loss) in their lower extremities due to characteristics of aging and decreased use. There are significant implications as far as developing frailty, a greater risk of falls and overall disability (Fielding et al, 2011). Individual structural constraints related to sarcopenia most often are attributed to a reduction in muscle mass and an increase in fat mass in an older adult population. Other structural constraints could be altered endocrine system functioning, inflammation, insulin resistance, and disuse. Individual functional constraints impacting rates of sarcopenia could be fear of falling, decreased motivation to be physically active, feelings of inadequacy when compared to other exercisers or the instructor (Fielding et al, 2011).

Recommendation: Resistance training in the class will help maintain existing muscle mass and reduce the loss of additional muscle tissue. Strength training can lead to rapid gains in muscle mass and strength, influencing all muscle fiber types. Instructing that resistance activity should be

moderate to high intensity by reasonably healthy older adults to increase and maintain muscle gains is an example of the use of a task constraint (Pyka, Lindenberger, Charette & Marcus, 1994). Another task constraint could be having a variety of resistance exercise methods available instead of one could help people feel that they are exercising appropriately for them, using weight machines versus therapy elastic bands versus free weights (Orr, Raymond & Singh, 2008). Environmental constraints usually have to do with safety concerns, such as the presence of adequate lighting and the absence of slick or moveable flooring surfaces (Chang et al, 2004). Changes to the environment the class is held in could be the addition of stationary but spongy floor coverings that could decrease risk of injury if a weight was dropped, and limiting the number of people who can observe the goings on of the class to decrease feelings of comparison between the participants and other senior center patrons. Examples of resistance exercises that could benefit older adults include leg extension and flexion, hip abduction and adduction, triceps press and back extension, possibly with the resistance of a therapy band (Pyka, et al 1994).

Observation 2

One of the defining characteristics of the class at the Eppson Center was to focus on increasing balance ability. Many of the class participants were observed to have significant deficiencies in balance performance.

Constraints: Capacity for stationary and dynamic balance changes as people age, and that change could be related to a number of individual structural constraints. Impaired balance, leading in many cases to falls, can be influenced by lower extremity muscle weakness, lack of coordination and decreased flexibility (Donat & Özcan, 2007). More specifically, strength and flexibility in the ankle and foot, as well as tactile sensitivity in the sole of the foot, may have a significant effect on balance ability (Menz, Morris & Lord, 2005). Additionally, changes in the visual and vestibular

system restrict the amount of information that older adults can get about their balance and position in space, affecting their balance (Manchester, Woollacott, Zederbauer-Hylton & Marin, 1989).

Individual functional constraints obviously include fears of falling, which can be quite intense for the balance-impaired older adult, as well as motivation to better their situation.

Recommendation: Focusing on increasing balance ability in older adults by improving lower leg strength. As mentioned in the previous recommendation, there are a variety of benefits to encouraging older adults to incorporate resistance training into their exercise routines. Farther than generalized muscle gains, there are specific balance advantages to resistance training.

Strengthening the calf muscle in particular aids in balance performance and may decrease balance variability (Onambele, Narici, & Maganaris, 2006). With the knowledge of the various individual constraints affecting balance, task and environmental constraints can be altered. Task constraints could include strategies such as encouraging practices such as using balance assistive devices (chairs, canes, etc.) and tests of balance to increase confidence. Some activities could be done without shoes to increase the level of sensation to the soles of the feet during balance exercises.

Building functional activities into the class period could also have significant benefits to balance, such as the sit-to-stand. Sit-to-stand performance, on its own being a strengthening exercise, can also be used as an approximate measure for balance ability because it is significantly associated with postural sway and lower limb proprioception (Lord, Murray, Chapman, Munro & Tiedemann, 2002). Environmental constraints such as making assistive devices available in the class space, holding class in a space that has a level floor unless an unstable surface is called for in specific exercises, and minimizing outside distraction that could detract from the balance task at hand. Exercises that could be useful for this recommendation include, sit-to-stands, single leg

stands, standing with novel foot placement, unfamiliar walking patterns (grapevine, walking toe-to-heel), and squats with leg lifts in between.

Observation 3

In addition to displaying balance ability that needed improvement, consistently there were indicators for decreased confidence in capacity to perform balance tasks at all, either static or dynamic, when asked by the instructor. Activities involving single-leg balance were often approached with more cautiousness, as seen by poor standing posture (hunched back, gaze on feet), as well as a greater amount of weight leaned on an assistive device, such as a chair or cane.

Constraints: Age has been negatively correlated with self-efficacy and confidence in exercise performance (Wilcox & Storandt, 1996). As people get older, unless they have a steady physical activity program over the course of their lifetimes, they feel less able to complete certain tasks, one of the very important ones being maintaining an adaptable balance capability. Individual structural constraints were described above, and could include physical frailty, loss of muscle mass in the lower extremities, decreased sensation in the soles of the feet or diminished flexibility (Rand et al, 2011; Donat & Özcan, 2007). When parts of the body that once worked perfectly do not do so anymore, this can be a disheartening and frustrating time. Individual functional constraints could be fear of falling, avoidance of activities and situations where balance is required such as in sport or when walking in the community, and irritation with not being able to function as independently as they once could (Rand et al, 2011; Büla et al, 2011).

Recommendation: Include an element of Tai Chi in the class instruction alongside traditional methods and strength training (Rand et al, 2011; Büla et al, 2011). Results of interventions to increase balance confidence as well as decrease fall risk have shown that of all the intervention

types, even when only considering those that focused on exercise, where the best method of facilitating balance confidence is to include a Tai Chi component. The practice of Tai Chi is a type of exercise that involves flow of gentle motion and stretching, which improves coordination, flexibility, and may improve some of the sensory-motor aspects of balance that could have been decreased through normal aging processes. There is also a focus on relaxation and body awareness in Tai Chi which could impact how people feel about their balance performance and reduce anxiety during activities (Rand et al, 2011). Task constraints could be integrating a Tai Chi element to the class periods, replacing some of the more traditional balance exercises. One type of Tai Chi, the 24-form, can be completed in as little as six minutes once the entire pattern is mastered, and can prove to be a highly effective balance exercise as well as relaxation technique for the end of a class period (Liang & Wu, 2005). Giving instruction that focuses on the pieces of a successful balance performance rather than the outcome may be more constructive than praising an appropriate final presentation, as well as acknowledging the different levels of ability presented by the class participants, making it easier or harder as necessary. Environmental constraints could be demonstrated in providing soft but firm floor covering in the case of a fall or loss of balance during class, a space where only the class participants are witness to the performance of others, assistive devices such as chairs that are sturdy and do not wobble when weight is leaned on them, and floor cleanliness so that if activities call for being barefoot they can be completed. When interacting with the class participants, focus on positive attitude and relaxed communication to not increase anxiety or uncertainty about performance, even during times of correction. Demonstrating confidence in the participants' ability to complete the tasks may help them believe it themselves.

Observation 4

Frequently when the instructor of the exercise group would change exercises or give suggestions on form, the participants in the class would need a few seconds to take in what had been said and respond. The responses by the instructors to this increased reaction time were varied, from quick-fire lists and having to repeat themselves, to waiting long enough for people in the class to ask for something to fill the dead space.

Constraints: Similar to the discussion from above, another one of the changes that comes with aging is a reduction in the speed of response, secondary to a decrease in the volume and quality of white matter in the brain (Voss et al, 2013). This is a very important individual structural constraint. A decline in white matter is associated with worsened cognitive functioning, particularly executive functioning which includes making decisions and planning which tasks to complete first. Response time has also been implicated as being more important in the process of recovering balance before a fall than walking speed, making work on improving this executive functioning important (van den Bogert & Grabiner, 2002). Individual functional constraints could include feeling “slow” or stupid when compared to others because of greater time required to make decisions or to process lists of instructions. Decreased confidence in physical activity ability because of the need for slower or repeated instructions could also be detrimental.

Recommendation: Reducing distraction and extending time between tasks may help understanding and action in a class setting. Eliminating distracting or intrusive unnecessary stimuli could go a long way in helping older adults to maintain better focus and perform better on tasks that require them to process information (Lustig, Hasher & Tonev, 2006). Also, allowing for more time between the presentation of a task and the expected following action appears to help older adults switch cognitively between activities (Cepeda, Kramer & Gonzalez de Sather, 2001). Finally,

aerobic exercise in particular has been shown to have positive effects on white matter in the brain, both on volume and quality, making the implementation of this type of activity important for maintenance of cognitive and executive abilities like making decisions or shift from one activity to another (Voss et al, 2013). For the instructors of the senior exercise and balance class, task constraints that could be employed include integrating and emphasizing aerobic exercise such as walking, swimming or cycling. Another suggestion would be to allow adequate time in the instruction phase of each activity for each of the participants to completely understand what was said and what is expected of them before moving on. This could be implemented by asking the participants to repeat back, when ready, what they were just asked to do, thereby reinforcing the information given to them once processed. Environmental constraints such as not using music during the class period, limiting the number of people who have access to the exercise space during class time, and having all of the equipment for the entire class present at the beginning so that the participants can visually take stock of what they have available to them while listening to instruction. This could help with conflicting thoughts or confusion about what to do next in a series of instructions.

Observation 5

Some of the class participants were consistently down about their performance, did not socialize well with others or only came to class sessions because they were brought by someone else. While none of the participants had all the characteristic signs of depression, various symptoms could be seen throughout the group.

Constraints: Depression affects seven million older adults every year, which can lead to them developing or worsening comorbid conditions or even experiencing premature mortality (Centers for Disease Control and Prevention, 2013). As discussed previously, individual structural

constraints affecting older adults' brains with depression or depression-like symptoms could include degradation of white matter, presence of cerebrovascular risk factors or disease, and executive functioning deficits (Fiske, Loebach-Wetherell & Gatz, 2009). Individual functional constraints include feelings of sadness, loss or frustration over a number of events such as a close friend or family member passing away, a move from home to a living facility where assistance is provided or the diagnosis of a chronic illness (Harris et al, 2003). In addition to these, individuals who have depression or who display depression symptoms may have significantly reduced self-esteem, self-worth and confidence, or be afraid of falling or injuring themselves making participation in exercise that much more difficult.

Recommendation: Encouraging attendance at exercise classes and participating can help with symptoms of depression in older adults. Not only does exercise, both aerobic and resistance, have positive effects on depression on its own, but when compared to traditional treatment from a physician, symptoms were reduced by almost 40% more (Singh et al, 2005). Additionally, and as good news for when trying to avoid increased cost or greater side effects, physical activity was found to be just as able to reduce signs and symptoms of depression at a similar rate to pharmacological treatment in older adults (Blumenthal et al, 2007). Task constraints could be structuring exercises in the class so that everyone can feel that they are succeeding, meaning not leading activities that could easily be failed by an inexperienced older adult. Additionally, having activities be low intensity but high in repetition could improve cognitive health, as well as increase exercise compliance, and lower the risk of harm (Tse, Wong & Lee, 2015). Environmental constraints could be using equipment that is accessible and easy to use for everyone (therapy bands and free weights versus weight machines) to encourage ability and confidence, creating an environment in the class where the participants encourage each other on their positive steps, not

always on the outcome, and where negative feelings are not dismissed, but addressed within the scope of the instructor's practice.

Observation 6

Almost all of the class participants exhibited some level of kyphotic (rounding of the upper back and neck) posture when observed in the class setting. Even with cues for improving posture, change was not noticeable.

Constraints: Kyphosis is described as an amplified anterior curvature of the thoracic spine that is related to aging (Katzman, Wanek, Shepard & Sellmeyer, 2010). The causes of kyphosis are multivariate, and could involve muscle weakness throughout the stabilizing and posture muscles of the back and core, or deteriorating vertebral discs. These are both examples of individual structural constraints. A history of vertebral fractures could also explain the presence of hyperkyphosis. Consequences of kyphosis of the thoracic spine can range from difficulty with functional activities and increased risk of falls to decreases in quality of life and greater mortality rates tracking with severity of kyphosis. Individual functional constraints could include greater fear of falling, feeling ashamed of their "dowager's hump", and generally experiencing less satisfaction with health, family and life in general (Katzman, Wanek, Shepard & Sellmeyer, 2010).

Recommendation: Integrating back and core strengthening exercises can attenuate or reverse kyphotic posture. Particularly exercises that focus on strengthening the extensor muscles of the back can delay the progression of kyphosis in older adults (Ball et al, 2009). This is sharp contrast to flexion exercises of the spine that have been shown to lead to greater rates of vertebral fracture, a noted risk factor for worsened kyphosis. Participating in exercises such as these that specifically target the upper thoracic region could significantly impact the development and severity of

kyphotic posture. Task constraints could be continuing to encourage active thinking about posture and alignment, as well as engaging in exercises as recommended in the Ball et al (2009) study including seated upward arm extension with a therapy band, contralateral arm and leg lift from an all-fours position, stretching a therapy band in front of the body laterally, and applying force to a corner between two walls with forearms at shoulder level. Environmental constraints could be making sure that adequate, appropriate and intact equipment for exercise is available, that the floors are clean, dry and level in the case of activities requiring being on the ground and using chairs for the class that are straight-backed, lightly cushioned without arms for practice with unassisted sitting with correct posture.

Observation 7

In particular, the women who would participate in the class often came in clothing and shoes that were not appropriate to the exercise setting, and may not have been able to engage fully in the activities because of their clothing/shoe choices.

Constraints: Exercise clothing is not made for older women, and does not fit them well. A common sentiment is that “people in exercise clothes look funny”, and older women do not want to be associated with looking unattractive, because of the clothing, or because of what the clothing represents (Jones & Nies, 1996). This is an example of an individual functional constraint. The women could be afraid of looking foolish, not feel confident with their bodies or not feel comfortable wearing the more leisurely style of clothing that is appropriate for physical activity. Being active involves working, sweating, breathing hard and generally not looking your best. When describing individual structural constraints, it has been expressed that many times older women are trying to cover up their bodies because they are not appealing anymore, citing issues such as weight gain, changes in body shape and composition, wrinkles and sagging skin (Hurd

Clarke, Griffin & Malhia, 2009). In these situations, the women wear clothing that they are socially comfortable in and that feels appropriate. However, slacks, button-down shirts and fashionable shoes are not conducive to exercise, and in some cases may cause more harm than good if the shoes in particular are not supportive.

Recommendation: Educate the class participants on the correct clothing to be worn for physical activity, and create a welcoming, safe space to wear this type of clothing. Proper clothing for exercise in older adults has been suggested as loose-fitting clothing appropriate for the weather, supportive undergarments if necessary, and layers to be removed as necessary while exercising. Guidelines for shoes include wearing those that are made for activity (tennis shoes, trainers), and that have qualities such as ankle and arch support, adequate width and considering which would be the most applicable to the class activities (Clark, 1993). Task constraints for the class instructor to use include short recommendations about what kind of clothing to be worn and acknowledgement that some activities will not be safe or efficacious for all of the class participants because of their clothing choices. For example, in the case of a class participant wearing sandals, the use of free weights or dumbbells may be contraindicated. Allowances will have to be made because clothing choices are difficult to persuade people to change. Environmental constraints could be making an effort to make the space comfortable for the participants to perhaps wear clothing that is different than what they are used to, such as obstructing the view of the exercise space so that people outside of the class environment cannot see in. Additionally, providing space for the storage of athletic clothing and shoes at the facility, in this case a senior center, where the class takes place may remind people that they need to wear different clothing than what they arrived in. Temperature regulation in the room where the exercise class will be held is also important, and

will help people perhaps feel the need to remove layers not only to help themselves stay comfortable while being active, but also decrease resistance from excess clothing.

Observation 8

The demographics of the exercise class participants were usually relatively healthy, approximately normal weight, Caucasian older adults. Taking into account the lack racial diversity in the Laramie community, there was also a deficit in minorities, overweight/obese or those with disease.

Constraints: Research on older adults has largely focused on community samples of people that are not necessarily unhealthy, just older or on those who have a singular disease state such as cardiovascular disease. Little has been done in the way of determining how the overarching exercise prescriptions for older adults can be specialized to minorities, disabled people or those with chronic illness (Brawley, Rejeski & King, 2003). There could be a number of contributing factors to this trend of research specialization and uncertainty about how to approach and integrate these people into physical activity interventions. Individual structural constraints that could be limiting people of other demographics in coming to exercise class sessions could include increased weight and reduced mobility, decreased capacity for activity (chest pain, shortness of breath) or other disabilities. Functional individual constraints could be an unwillingness to go to a class without minorities/overweight/obese/disabilities represented, a fear of the effects of exercise on disease conditions, lack of social connectedness within the senior center community, or lack of knowledge about the existence of the exercise class.

Recommendation: Recruit people from all groups at the senior center, as well as advertise the class in other locations in the Laramie community, such as grocery stores, doctors' offices, online through the senior center website and other aging resources in the area like the Wyoming Center

on Aging and the Wyoming Institute for Disability on the University of Wyoming campus to encourage diversity and extend the reach of the class. On the occasion of recruiting a more diverse group of class participants, there are a number of strategies that can be used to retain people. Task constraints could include how the recruitment was done, through flyers, newspaper advertisements, word of mouth or visits to the senior center, inclusion criteria, whether certain older people should be referred elsewhere for their exercise needs or can be sufficient on their own, and how compliance with the exercise class is defined (Warren-Findlow, Prohaska & Freedman, 2003). While some structure and discipline may be necessary, and advertising can only go so far, in general, the more relaxed the restrictions on the class, the greater opportunity there is for people to join and reap benefits. Environmental constraints comprise the setting of the class, which unfortunately cannot be changed and still retain the core of the class, as well as the interpersonal aspects such as relationship with the instructor, opportunities to socialize with friends/acquaintances, and suggestions from a physician or trusted healthcare provider (Warren-Findlow, Prohaska & Freedman, 2003). Involvement particularly with physicians and in the community about physical activity self-efficacy and confidence could also improve recruitment and retention rates for older adult exercise. As many avenues as can be explored should be when there are so many elderly people in the community who could benefit from an exercise intervention or class who do not recognize their opportunity (Clark, 1997). Even with a class location that is somewhat out of the way for most older adults, if they feel like their situation could be favorably represented, they could see their friends there, and encounter an atmosphere of support and willingness to personalize the exercise experience, there could be significant room for increasing class attendance to include and reach past the current over 65, Caucasian, moderately healthy individual.

Observation 9

Observation of the balance and exercise class was only completed on four days of a much longer program cycle, but there appeared to be a lack of knowledge from the instructors about baseline performance on various exercise tasks by the class participants, as well as few performance-centered goals. If these had been present, mention of them might have been made as progress was achieved.

Constraints: The use of standardized exercise tests for older adults has been minimal at best. There is a lack of consensus about which tests to use in which situations, what the results of the test indicate and uncertainty about the tangible benefits. Similar to any other type of testing, there is effort involved in setting up and measuring performance accurately for the instructor, as well as potential added anxiety for class participants (Noonan & Dean, 2000). Generally the tests involve some kind of physical activity, measuring walking speed, walking distance per time, balance ability or functional capacity to complete tasks like getting out of a chair (Steffen, Hacker & Mollinger, 2002). Individual constraints related to these tasks could be muscle loss in the lower extremities, decreased mobility and flexibility, impaired balance capacity and changes in functional ability. These characteristics are what the tests are meant to measure, which could cause individual functional constraints to be displayed, such as fear of falling, low self confidence in ability, anxiety about performance on tests and uncertainty about knowing exactly how much of their capacity for movement has been lost.

Recommendation: Incorporate standardized exercise testing in the class proceedings, set goals with individual participants based on their performance and repeat the measures per appropriate time period, every month or six weeks. Evaluating older adults at a “baseline” is important for knowing when they are improving, declining or are at risk for other injury or falls. Knowing as

much as possible about the performance ability of each person attending the class will help shape the exercises and activities, determine whether intensity and difficulty need to be scaled up or down and start the framework for building individual goals and desired outcomes for attending class (Jones & Rikli, 2002). Task constraints could be designating one day out of the month, or every six weeks, as being testing day, where people only have to come for a specific predetermined time. During this time, tests designed for older adults such as the 6-Minute Walk Test, the Berg Balance test, the Timed Up-And-Go test and general gait speed measurement could be administered, and the results discussed (Steffen, Hacker & Mollinger, 2002). These type of tests are known as submaximal because they are conducted at an intensity that is beneath what is the limit of the person's ability, and in measuring these outcomes, estimates can be made for each participant's maximal capacity. This is a useful value to have to understand how much each person can be pushed and how much improvement they can make (Noonan & Dean, 2000). Constructing this picture of each person at baseline could prove invaluable when evaluating progress and determining whether class attendance is allowing each person to meet their physical activity and balance goals. Environmental constraints include amassing the appropriate equipment and setting for each test, such as having adequate space for a "track" to walk around for the 6-Minute Walk test, as well as chairs with no arms and stopwatches for the Timed Up-And-Go. Characteristics of the space would include separating the testing space from view of anyone walking through the senior center, low ambient noise to facilitate concentration and giving encouragement about performance only after the test is complete. Including this exercise testing component could truly increase the knowledge the instructors have about their participants and in what directions to guide the class.

Observation 10

Often when the class participants would talk to themselves about their performance, under their breath, or in repeated statements about what to do during exercises, there were negative sentiments. This deprecating self-talk was also present when the participants would talk to each other out of earshot of the instructor.

Constraints: During physical activity, attitude and focus are very important. The way that people talk to themselves and perceive their own performance can make or break participation in exercise, a pursuit that is not intrinsically enjoyed by many older adults (Betz, 2004). Engaging in negative self-talk during activity can lead to a downward cycle where performance is affected, causing even less confidence in performance, leading to decreased motivation to engage in a task that is felt to be a failure. This is a representation of the individual functional constraints influencing older adults, where other fears, insecurities, depression or issues in motivation find their way out into the performance of the exercisers through self-talk, or mediated when self-deprecating speech is directed at another person. The absence of positive exercise experiences in the future, and therefore having to face the unknown in old age, also contributes to self-talk being negative. Self-talk generally is not well controlled in people who have not been trained to identify negative cycles, and then the self-talk may control behavior unconsciously (O'Brien Cousins & Gillis, 2005). Individual structural constraints are any of those discussed that could possibly impact performance on exercise activities and therefore lead to negative self-talk, such as decreased muscular strength, flexibility or mobility, impaired balance ability or posture, disease and history of injury. The effects of any or a combination of these could lead to decreased self-efficacy and therefore to impaired self-talk.

Recommendation: Introduce measures to encourage positive self-talk such as focusing on parts of the activity that went right, instead of what went wrong, building others up when they begin to talk negatively and use of the phrase “Just do it, before you talk yourself out of it” (O’Brien Cousins & Gillis, 2005). Every person talks to themselves negatively, particularly when it comes to physical activity, because it is difficult, does not always feel good and involves the possibility of failure. The difference between people who are able to maintain their physical activity routine and those that cannot, excepting instances of injury or illness, is that the active older adults can manage their negative self-talk and balance it out with a stronger positive thought (O’Brien Cousins, 2003). Task constraints could include asking people to voice their negative thoughts at the beginning of the class period, getting out all of their anxiety before the exercise portion begins so that everyone can start from a positive place. It would be counterproductive to “outlaw” negative thoughts because they never truly go away, even in highly successful active people. Acknowledging the fears and motivations that are unique to older adults and using those as cues for the goals and purpose of physical activity could help people feel better about their performance. Environmental constraints could be the use of positive signage or verbalizations while doing the exercise activities. Similar to all of the other recommendations, older adults may not feel comfortable doing exercise in full view of others or their peers, so obstructing the class activities from general sight could help people feel that they are in a space where they do not have to feel negative about their performance or put themselves down because only trusted, supportive people can see them. Facilitating the ability for the participants to get to know each other, and their strengths and weaknesses, could allow communication about negative thoughts and a group mentality for dealing with them before they seriously impact performance. Though it is difficult to change the overall theme to self-talk in physical activity without positive mastery experiences in a participant’s past, reminders that they have completed other challenging tasks in the previously

with no experience or certainty about the outcome could be the necessary push to increase self-efficacy (O'Brien Cousins, 2003).

Conclusions and Discussion

There is a significant difference between performing a research study with real people and drawing conclusions and observing people and applying previously completed research. The conditions between real life and the studies may not be the same, making generalization difficult. People studied in one specific geographic area or living arrangement may be different from those in other locations or communities. The generation that is currently over 65 is commonly lumped together into one homogenous group, but differences between individuals can be quite substantial when considering past experience, health status, personality and access to facilities. Not all attributes can be addressed in every study; the scope would be too big. Therefore, for this particular research endeavor, the range of work was limited to the individuals who participate in the senior balance and exercise class at the senior center in Laramie, Wyoming. It was encouraging that many of the observations made of the exercise class were supported, at least in name and description, by current research on physical activity on older adults. Developmentally appropriate practices based in research can have multivariate meanings, thereby making recommendations easier and harder because the field of research is so large.

Error was introduced into this project through a few avenues. First, observations were made of the class by one person. This introduces a bias because of the previous knowledge and experience of the principle investigator, where certain actions and attitudes may have been expected to occur, and therefore were seen and noted. Additionally, because there was only one observer and several more of the participants and instructor, it was impossible to view the class from every angle and observe all goings on that could have lent themselves to becoming evidence-

based recommendations. Another source of error could have been the style with which observations were taken down in record. A standardized list of possible behaviors and actions was not used for the observation times, which could have helped narrow down what was being looked for. The option of taking observation notes with this method was discarded to not limit what could be seen or to dismiss the notion that behaviors could be observed that were not included on the standardized list. A third source of error could have been that only one class was observed, on a select number of days, and that because of the rotation of the instructors, only one of the class leaders was observed twice. If the sample size of the class participants had been larger, if more than one class had been observed and compared to the first, and if observations had occurred on more than four days, the outcomes of the study may have been affected. The recommendations may have been more able to be generalized to a greater population of active older adults. Observing only one of the class instructors twice could have biased the recommendations in favor of that one teaching style and class proceeding. All of these error sources could have impacted the final results and recommendations as described here.

In spite of these sources of error, the data presented here is still valuable and useful. The observations may have only occurred in one setting and in a limited capacity, but the collection and synthesis of research in the field of older adult physical activity is worthwhile and could help inform future projects. Research studies tend to focus on specific aspects of older adults and their behavior, whereas the implications of the Task Constraint Model as presented by Newell (1986) are that people are impacted by individual qualities, their environment and the limitations placed on them by any given task. Taking an approach that only reports on singular aspects of the lives of older adults is important, but does not always describe the complex interactions that occur.

Through research it has been shown that people who are more adherent to physical activity regimens are healthier, wealthier, have fewer functional limitations and are cognitively sound (Picorelli et al, 2014). This is a best case scenario for an older adult and one that all people should aspire to. Unfortunately, rarely are populations of older adults able to check every one of those boxes, and will need special consideration to make physical activity accessible, beneficial and interesting to them. Commonly, older adults are forced to comply with rules and recommendations that are made for people much younger than them because of ease or a lack of reliable research to support what should be done specifically with older adults. The determination and effort being put forth for children, adolescents and adults to make activities the best possible based on age-defined and suggested characteristics should be carried over in a more comprehensive way to older adults.

For all of the concern over the declining rate of physical activity in older adults, and the associated health, behavioral and social consequences, there has not been much concentrated work on bringing all fields of study together to benefit the population as a whole. Considering individual features will help encourage older adults of all types become more committed to physical activity in any number of ways. Research should be obliged to not only forward the general knowledge about a field, but also to make real recommendations about real people to be physically active however they can in a way that is appropriate for them.

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